FIG. 1 PRIOR ART

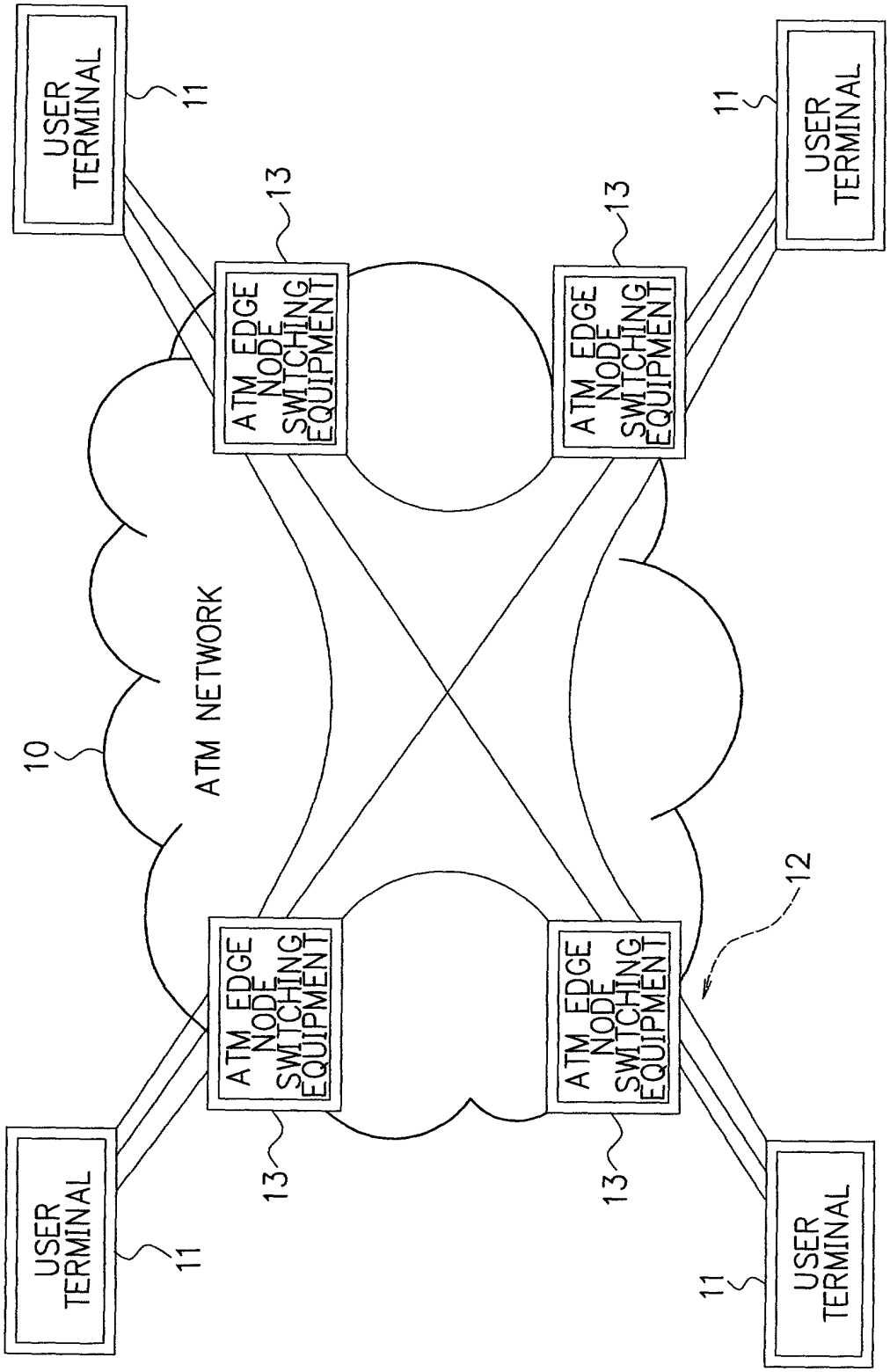


FIG. 2

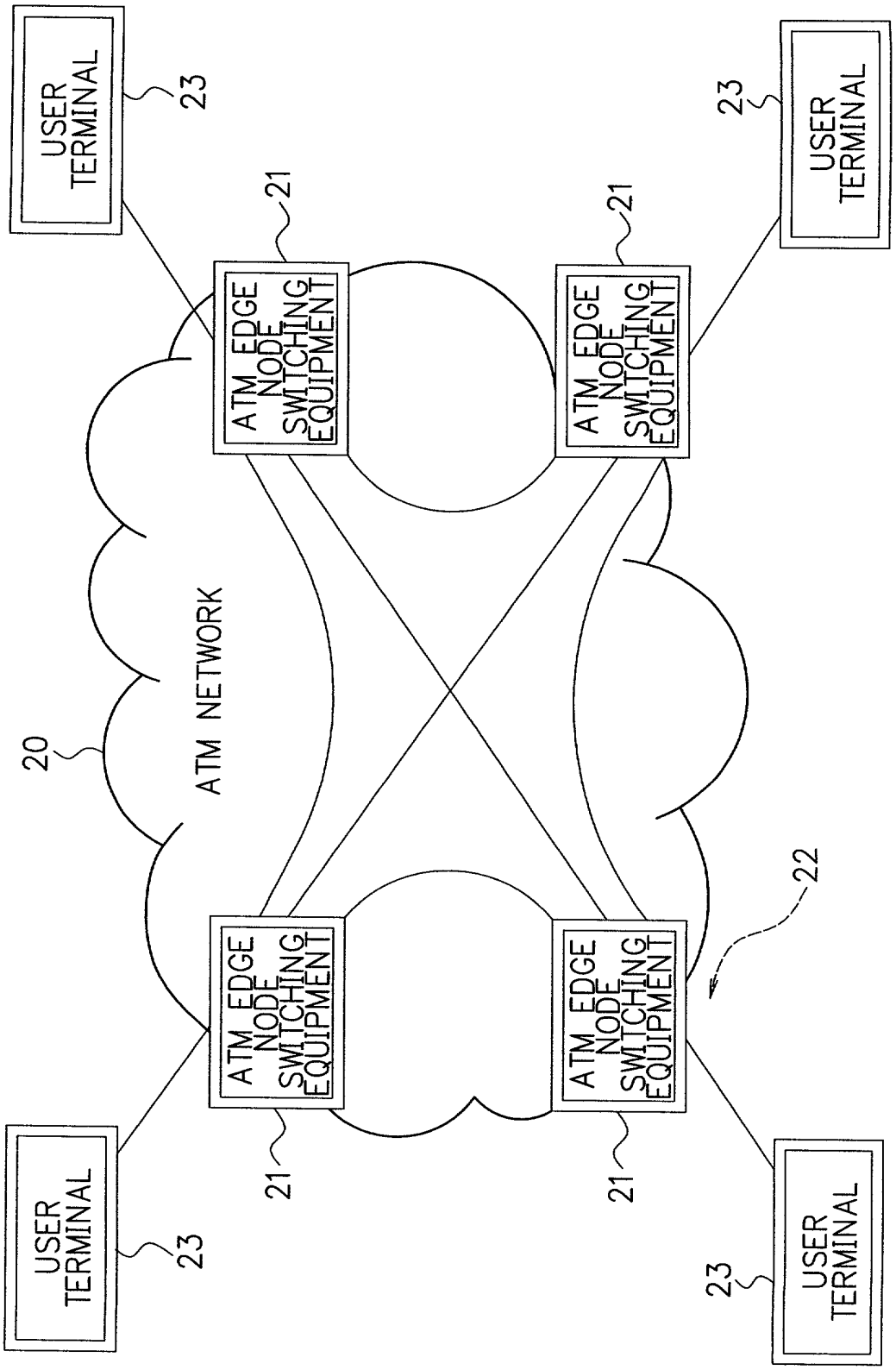

USER TERMINAL
23
ATM EDGE NODE SWITCHING EQUIPMENT
21
ATM NETWORK
20
22

FIG. 3

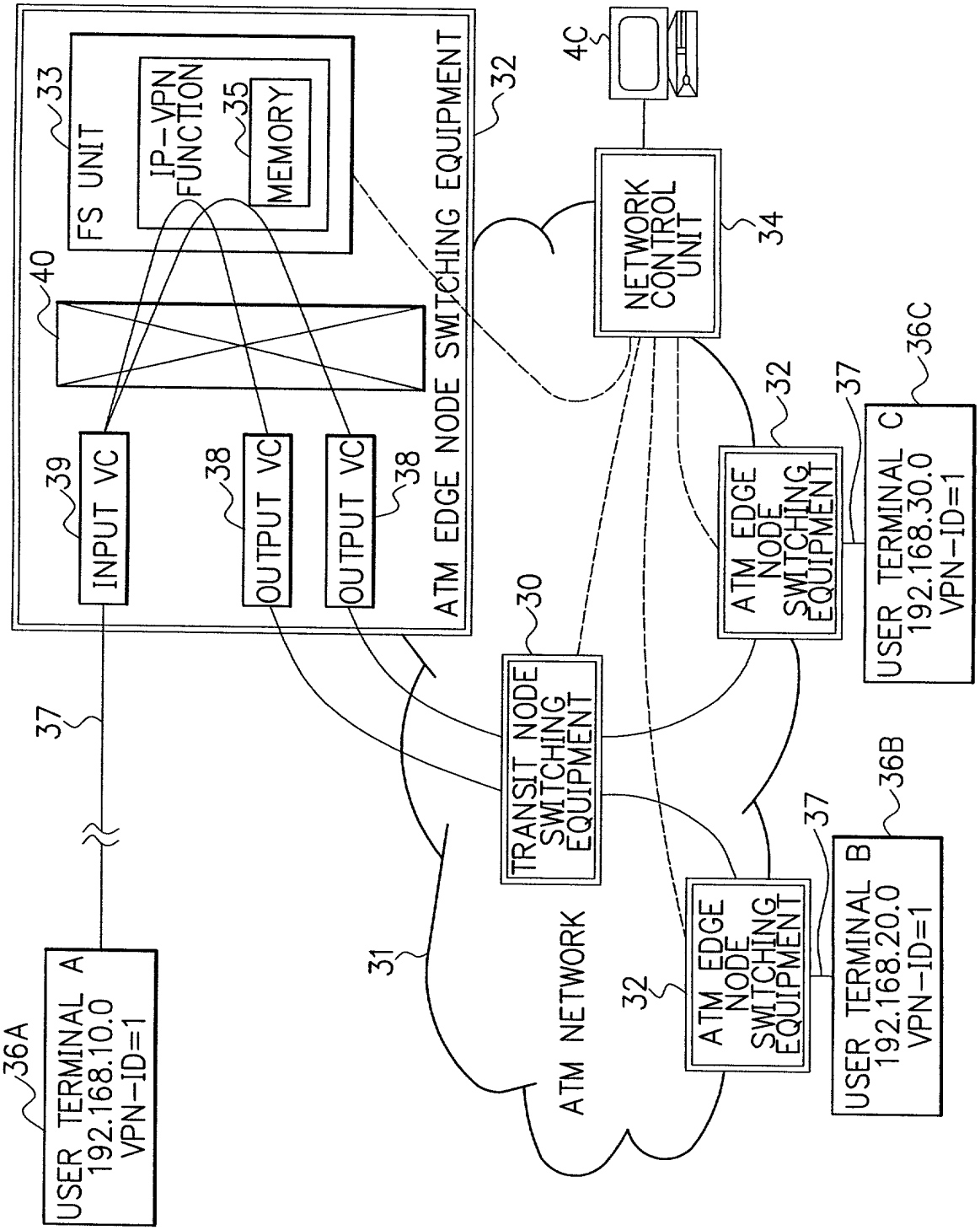

ATM EDGE NODE SWITCHING EQUIPMENT
32
FS UNIT
33
IP-VPN FUNCTION
35
MEMORY
40
INPUT VC
39
OUTPUT VC
38
OUTPUT VC
38
4C
NETWORK CONTROL UNIT
34
TRANSIT NODE SWITCHING EQUIPMENT
30
ATM NETWORK
31
ATM EDGE NODE SWITCHING EQUIPMENT
32
ATM EDGE NODE SWITCHING EQUIPMENT
32
37
37
37
USER TERMINAL A
192.168.10.0
VPN-ID=1
36A
USER TERMINAL B
192.168.20.0
VPN-ID=1
36B
USER TERMINAL C
192.168.30.0
VPN-ID=1
36C

FIG. 4

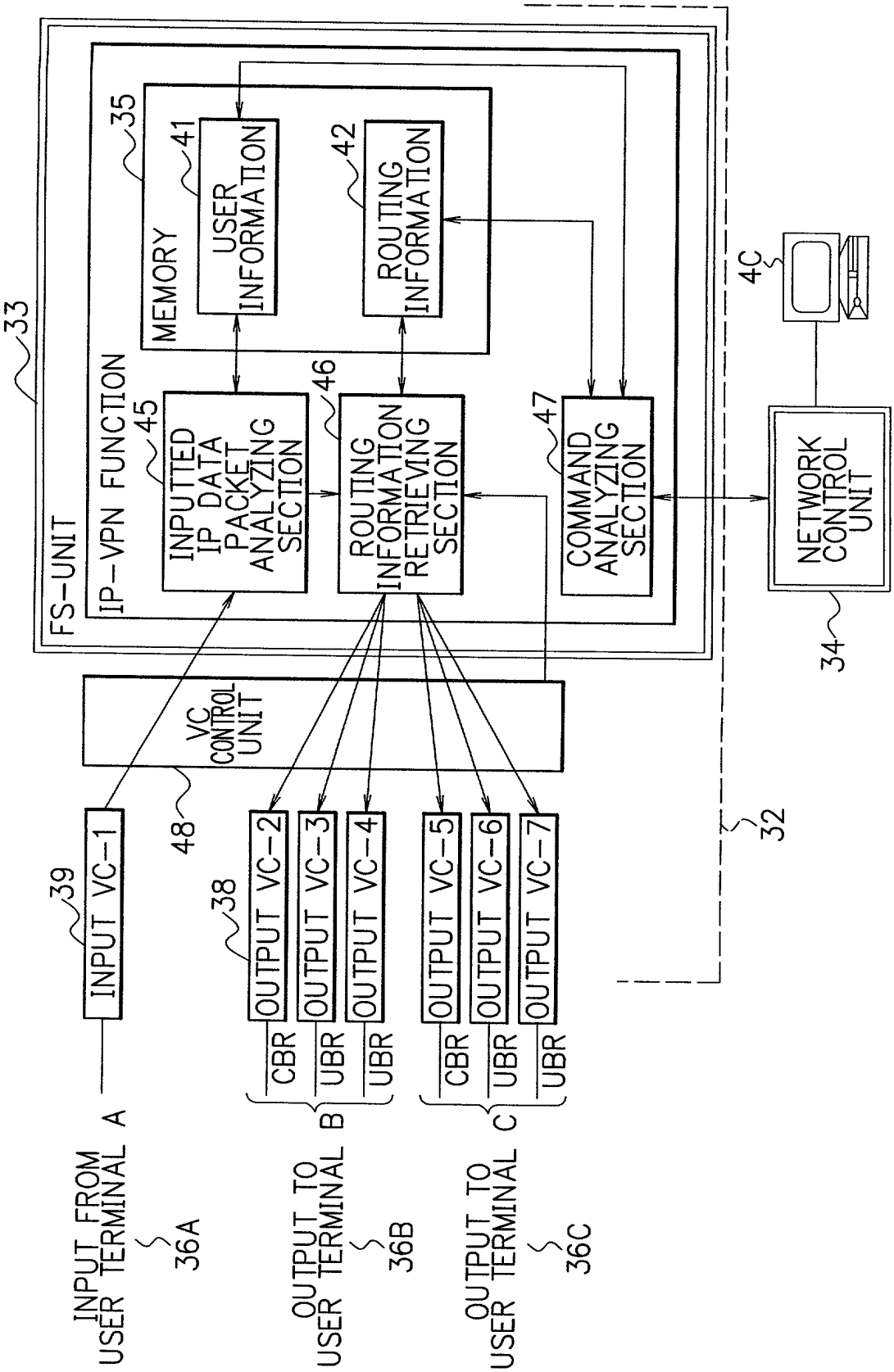
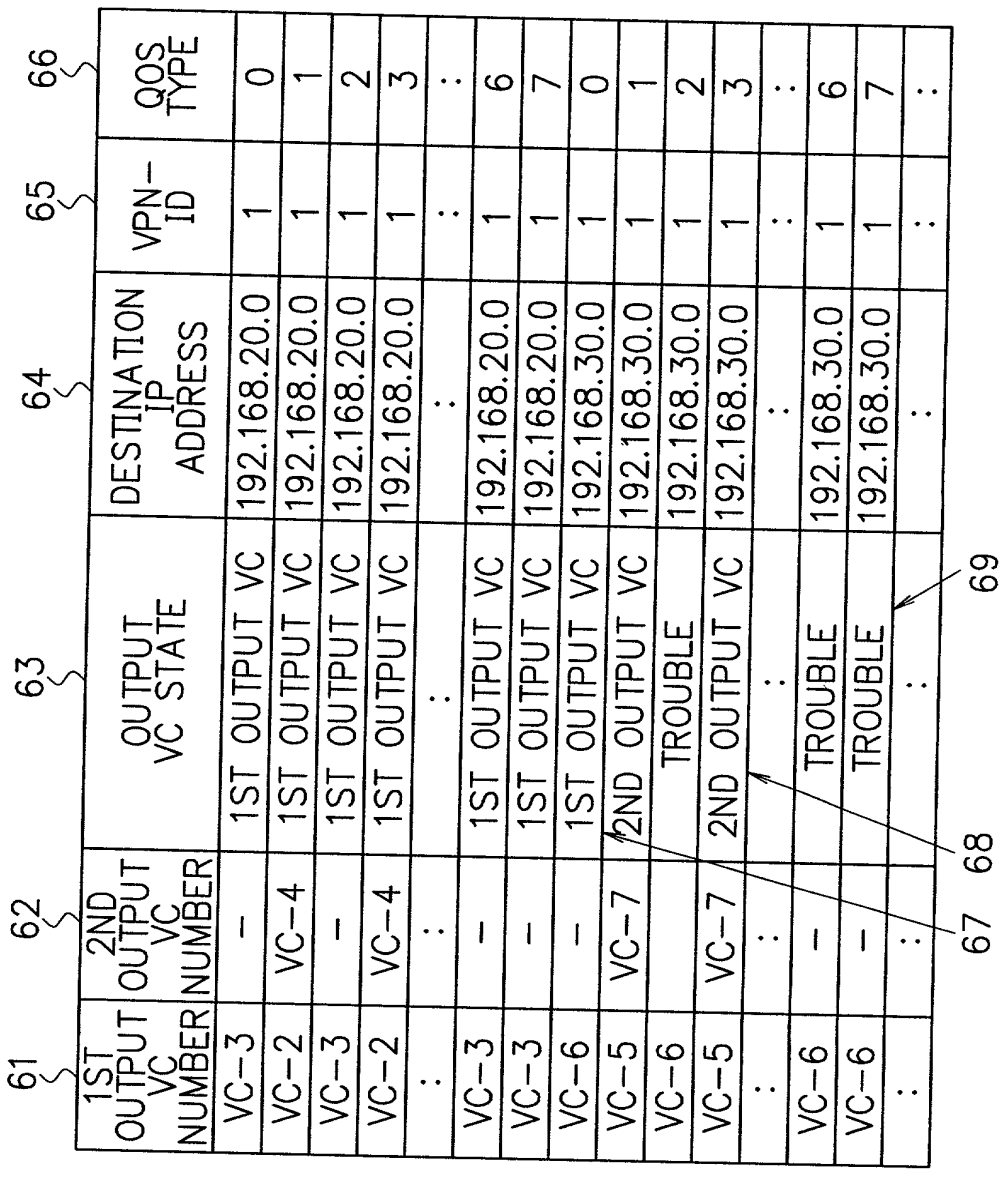

33
FS-UNIT
IP-VPN FUNCTION
35
MEMORY
41
USER INFORMATION
42
ROUTING INFORMATION
45
INPUTTED IP DATA PACKET ANALYZING SECTION
46
ROUTING INFORMATION RETRIEVING SECTION
47
COMMAND ANALYZING SECTION
4C
NETWORK CONTROL UNIT
34
32
VC CONTROL UNIT
48
39
INPUT VC-1
38
OUTPUT VC-2
OUTPUT VC-3
OUTPUT VC-4
OUTPUT VC-5
OUTPUT VC-6
OUTPUT VC-7
CBR
UBR
UBR
CBR
UBR
UBR
A
B
C
INPUT FROM USER TERMINAL
36A
OUTPUT TO USER TERMINAL
36B
OUTPUT TO USER TERMINAL
36C

FIG. 5

51 VPN-ID	52 QOS TYPE	53 INPUT VC NUMBER	54 PROTOCOL TYPE	55 DESTINATION SERVICE PORT NUMBER	56 SOURCE ADDRESS SERVICE PORT NUMBER	57 CODE POINT
1	0	VC-1	–	–	–	–
1	1	VC-1	6(TCP)	80(http)	–	–
1	2	VC-1	6(TCP)	21(ftp)	–	–
1	3	VC-1	–	–	–	101110
:	:	:	:	:	:	:
1	6	VC-1	17(UDP)	–	512(RIP)	–
1	7	VC-1	6(TCP)	25(smtp)	–	–
:	:	:	:	:	:	:

QOS INFORMATION 58

FIG. 6



61 1ST OUTPUT VC NUMBER	62 2ND OUTPUT VC NUMBER	63 OUTPUT VC STATE	64 DESTINATION IP ADDRESS	65 VPN-ID	66 QOS TYPE	
VC-3	—	1ST OUTPUT VC	192.168.20.0	1	0	OUTPUT TO USER TERMINAL B
VC-2	VC-4	1ST OUTPUT VC	192.168.20.0	1	1	
VC-3	—	1ST OUTPUT VC	192.168.20.0	1	2	
VC-2	VC-4	1ST OUTPUT VC	192.168.20.0	1	3	
:	:	:	:	:	:	
VC-3	—	1ST OUTPUT VC	192.168.20.0	1	6	
VC-3	—	1ST OUTPUT VC	192.168.20.0	1	7	
VC-6	—	1ST OUTPUT VC	192.168.30.0	1	0	OUTPUT TO USER TERMINAL C
VC-5	VC-7	2ND OUTPUT VC	192.168.30.0	1	1	
VC-6		TROUBLE	192.168.30.0	1	2	
VC-5	VC-7	2ND OUTPUT VC	192.168.30.0	1	3	
:	:	:	:	:	:	
VC-6	—	TROUBLE	192.168.30.0	1	6	
VC-6	—	TROUBLE	192.168.30.0	1	7	
:	:	:	:	:	:	

67 68 69

FIG. 7

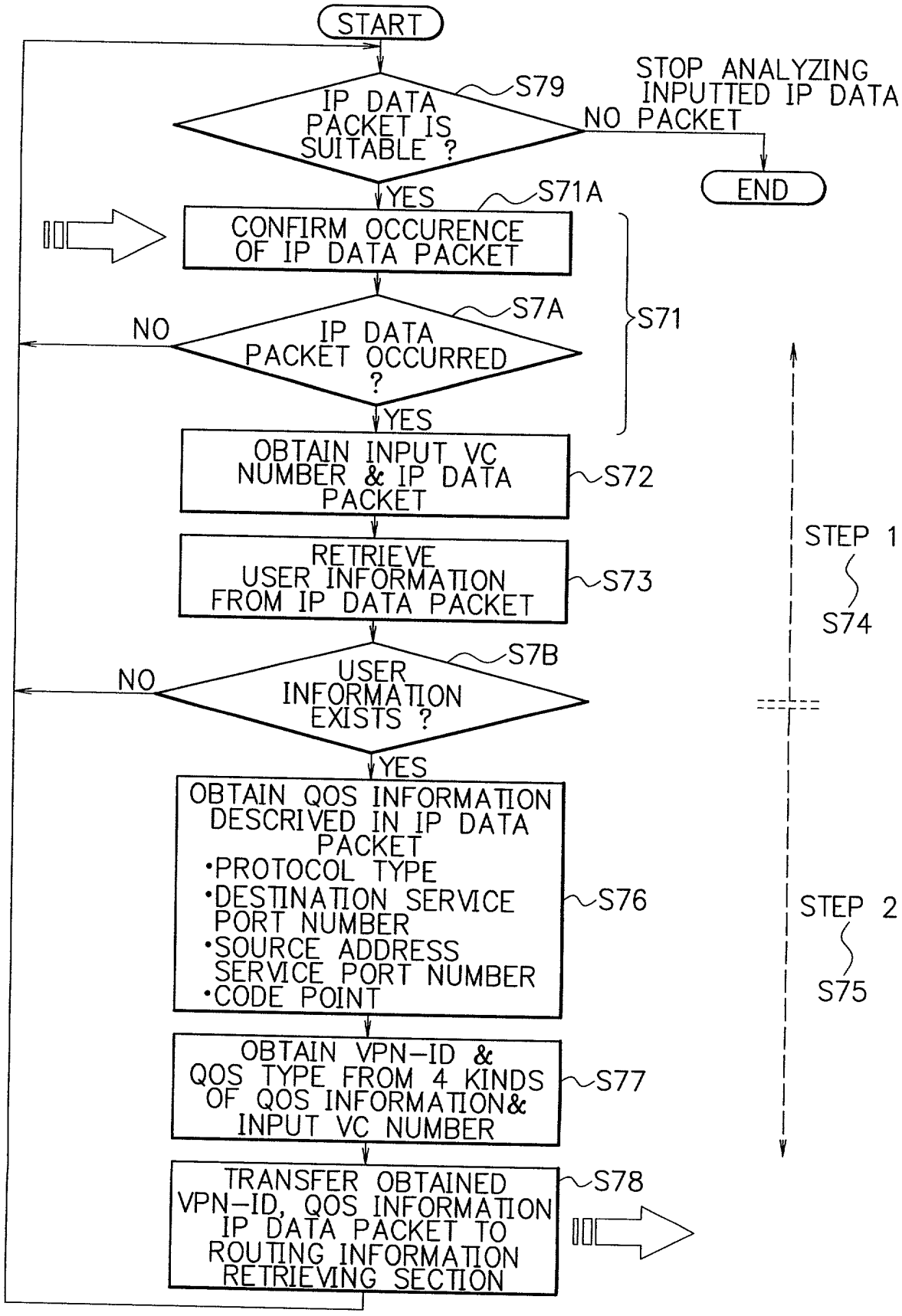

START
IP DATA PACKET IS SUITABLE ?
S79
NO PACKET
STOP ANALYZING INPUTTED IP DATA
END
YES
S71A
CONFIRM OCCURENCE OF IP DATA PACKET
S7A
NO
IP DATA PACKET OCCURRED ?
S71
YES
OBTAIN INPUT VC NUMBER & IP DATA PACKET
S72
RETRIEVE USER INFORMATION FROM IP DATA PACKET
S73
S7B
NO
USER INFORMATION EXISTS ?
YES
OBTAIN QOS INFORMATION DESCRIVED IN IP DATA PACKET
•PROTOCOL TYPE
•DESTINATION SERVICE PORT NUMBER
•SOURCE ADDRESS SERVICE PORT NUMBER
•CODE POINT
S76
OBTAIN VPN-ID & QOS TYPE FROM 4 KINDS OF QOS INFORMATION& INPUT VC NUMBER
S77
TRANSFER OBTAINED VPN-ID, QOS INFORMATION IP DATA PACKET TO ROUTING INFORMATION RETRIEVING SECTION
S78
STEP 1
S74
STEP 2
S75

FIG. 8

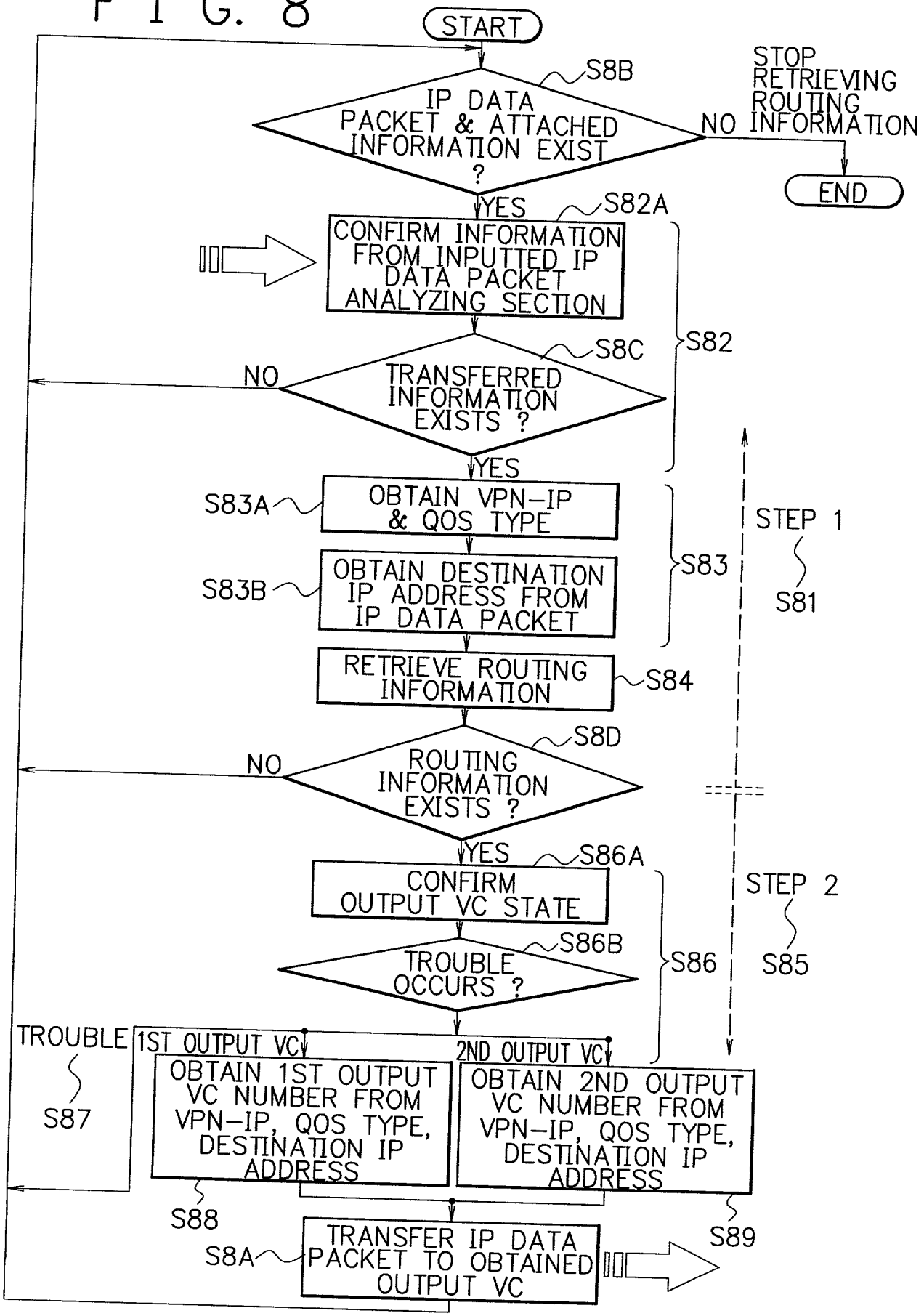
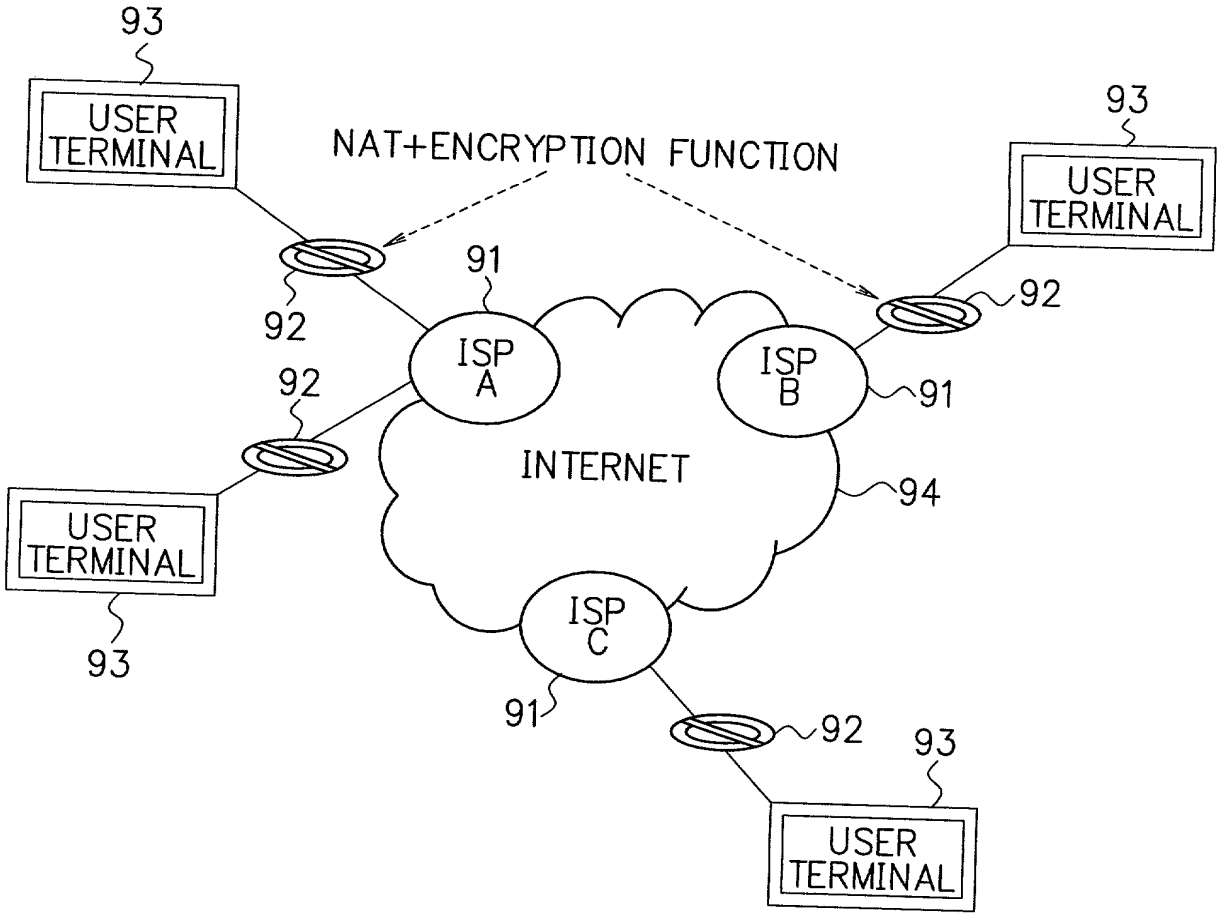

START
S8B
IP DATA PACKET & ATTACHED INFORMATION EXIST ?
NO
STOP RETRIEVING ROUTING INFORMATION
END
YES
S82A
CONFIRM INFORMATION FROM INPUTTED IP DATA PACKET ANALYZING SECTION
S8C
NO
TRANSFERRED INFORMATION EXISTS ?
S82
YES
S83A
OBTAIN VPN-IP & QOS TYPE
S83B
OBTAIN DESTINATION IP ADDRESS FROM IP DATA PACKET
S83
STEP 1
S81
RETRIEVE ROUTING INFORMATION
S84
S8D
NO
ROUTING INFORMATION EXISTS ?
YES
S86A
CONFIRM OUTPUT VC STATE
S86B
TROUBLE OCCURS ?
S86
STEP 2
S85
TROUBLE
S87
1ST OUTPUT VC
OBTAIN 1ST OUTPUT VC NUMBER FROM VPN-IP, QOS TYPE, DESTINATION IP ADDRESS
S88
2ND OUTPUT VC
OBTAIN 2ND OUTPUT VC NUMBER FROM VPN-IP, QOS TYPE, DESTINATION IP ADDRESS
S89
S8A
TRANSFER IP DATA PACKET TO OBTAINED OUTPUT VC

FIG. 9


93
USER TERMINAL
NAT+ENCRYPTION FUNCTION
93
USER TERMINAL
92
91
92
ISP A
ISP B
91
92
INTERNET
94
USER TERMINAL
93
ISP C
91
92
93
USER TERMINAL